

WHAT IS CLAIMED IS:

1. A lockup control device for a torque converter for a vehicle, the torque converter comprising a pump impeller and a turbine runner transmitting therebetween a torque via a fluid, and a lockup clutch which engages the pump impeller and turbine runner under an engaging force in response to an oil pressure, the device comprising:

an oil pressure control valve which supplies the oil pressure to the lockup clutch;

a sensor which detects a rotation speed of the turbine runner; and

a controller programmed to:

calculate a speed increase rate of the turbine runner from the rotation speed of the turbine runner;

determine a target oil pressure based on a pressure increase rate which is set to increase as the speed increase rate increases; and

cause the oil pressure control valve to supply the target oil pressure to the lockup clutch.

2. The lockup control device as defined in Claim 1, wherein the controller is further programmed to compare the rotation speed of the turbine runner with a predetermined rotation speed, and when the rotation speed of the turbine runner exceeds the predetermined rotation speed, determine a subsequent target oil pressure based on the pressure increase rate when the rotation speed of the turbine runner exceeded the predetermined rotation speed.

3. The lockup control device as defined in Claim 2, wherein the controller is further programmed to compare the pressure increase rate when the rotation speed of the turbine runner exceeded the predetermined rotation speed with a predetermined range, and when the pressure increase rate lies outside the predetermined range, correct the pressure increase rate to the predetermined range.

4. The lock up control device as defined in Claim 1, wherein the pump impeller is connected to an engine of the vehicle, and the turbine runner is connected to an automatic transmission of the vehicle.

5. The lock up control device as defined in Claim 4, wherein the control device further comprises a sensor which detects a vehicle speed, and the controller is further programmed, when the vehicle speed does not reach a predetermined speed, to cause the oil pressure control valve to supply the oil pressure corresponding to the engaging force of zero.

6. The lockup control device as defined in Claim 1, wherein the lockup clutch comprises a clutch which varies an engaging force according to a differential pressure between an application pressure and a release pressure, and the oil pressure control valve comprises a spool valve which varies the differential pressure in response to a signal pressure generated by a solenoid according to a signal from the controller.

7. A lockup control device for a torque converter for a vehicle, the torque converter comprising a pump impeller and a turbine runner transmitting therebetween a

torque via a fluid, and a lockup clutch which engages the pump impeller and turbine runner under an engaging force in response to an oil pressure, the device comprising:

an oil pressure control valve which supplies the oil pressure to the lockup clutch;

means for determining a rotation speed of the turbine runner;

means for calculating a speed increase rate of the turbine runner from a rotation speed of the turbine runner;

means for determining a target oil pressure based on a pressure increase rate which is set to increase as the speed increase rate increases; and

means for causing the oil pressure control valve to supply the target oil pressure to the lockup clutch.

8. A lockup control method for a torque converter for a vehicle, the torque converter comprising a pump impeller and a turbine runner transmitting therebetween a torque via a fluid, a lockup clutch which engages the pump impeller and turbine runner under an engaging force in response to an oil pressure, and an oil pressure control valve which supplies the oil pressure to the lockup clutch, the method comprising:

determining a rotation speed of the turbine runner;

calculating a speed increase rate of the turbine runner from a rotation speed of the turbine runner;

determining a target oil pressure based on a pressure increase rate which is set to increase as the speed increase rate increases; and

causing the oil pressure control valve to supply the target oil pressure to the

lockup clutch.